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The Prognosis of Low Back Pain in General Practice

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Study Design. A prospective cohort study on low back pain in consecutive patients in general practice, in which potential prognostic indicators at baseline and at the 1-year follow-up examination were assessed by means of four weekly questionnaires.

Objectives. To identify prognostic indicators of the duration of low back pain in general practice and the occurrence of a relapse.

Background. Little is known about the prognosis of low back pain in general practice. Different designs and different results of preceding studies make drawing conclusions about the prognostic indicators, if any, of the course of low back pain in general practice difficult.

Methods. For a period of 2 years, 15 general practitioners from Amsterdam and surrounding areas studied consecutive patients with chronic low back pain and those with a recent onset of low back pain. A large number of potential prognostic indicators were assessed at the initial visit. After the initial visit, each patient was monitored for a period of 12 months. The follow-up assessment was conducted with four weekly postal questionnaires. The associations among the potential prognostic indicators, the duration of the index episode, and the occurrence of a relapse were analyzed using multivariate Cox regression and logistic regression analysis, respectively.

Results. Of the 605 patients identified, 443 were included in the follow-up period of assessment; the questionnaires were completed by 269 patients. In general, patients with less severe low back pain participated less often or did not complete the follow-up study. Thirty-five percent of the population still experienced low back pain after 12 weeks, and 10% still experienced it after 1 year. Approximately three of every four patients whose index episode ended before the end of the follow-up period had one or more relapses within a year. The analysis resulted in a model with four variables predicting the duration of the low back pain, including "the duration of the low back pain preceding the initial visit," "receiving physical therapy," "pain intensity," and "history of back surgery." Daily functioning appeared to be the only variable that was significantly associated with the occurrence of a relapse.

Conclusions. Only a few variables appear to be related to the clinical course of low back pain seen in general practice. In particular, the duration preceding the initial visit and, unexpectedly, receiving physical therapy were both associated with a longer duration of low back pain. [Key words: backache, clinical course, general practice, prognosis] **Spine 1997;22:1515–1521**

Low back pain is still a major topic in general practice. It is one of the most frequently seen problems and has considerable impact on the lives of patients involved. To date, no therapy has been proven to be effective.[21] Consequently, making a prognosis, *i.e.*, predicting the future course, is a main issue in the management of low back pain.[21,24] Little is known, however, about the clinical course of low back pain presented in general practice.[8] In 1987 the Quebec Task Force on Spinal Disorders concluded, "Prognosis has become a matter of opinion and not of fact. Accordingly, the prudent clinician should be conscious of the need to identify, as early as possible, factors likely to lead to chronic distress and chronic functional disability. Research into these factors is essential if management strategies are to succeed."[21]

From reviewing the literature, the authors of the present study identified only eight studies on possible prognostic indicators for the clinical course of low back pain in general practice.[2,3,5,12,16,19,20,23] In three studies, prognostic indicators in consecutive cases, *i.e.*, recent onset and chronic cases, were reported.[5,12,23] In the other five studies, inclusion was restricted to recent-onset cases of varying duration.[2,3,12,19,20] The follow-up period lasted longer than 6 months in only three studies.[16,20,23] In many cases, however, a shorter follow-up period would be inadequate to determine the end of the low back pain episode or possible relapses.[21,24] Prognostic indicators were reported as radiation into one or both legs in three studies, preceding episodes of low back pain in four studies, a gradual onset in two studies, the duration at the patient's inclusion in three studies, and the history of low back pain in one study.[2,3,5,12,16,19,20,23] Most of the findings of the physical examination contained little or no prognostic information. Limited rais-

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ing appeared to be a prognostic indicator in two studies.[12,19] Further, the severity of the disability at the time of the patient's inclusion into the study and some psychological and sociologic characteristics appeared to be prognostic indicators in a number of studies.[3,5,19,20,23]

The various study designs, either because of the difference in inclusion criteria or because of an inadequate duration of the follow-up period, have not been conducive to a meaningful interpretation of the results. Although most of the items also were analyzed in other studies, none were reported to be prognostic indicators in more than four studies. Consequently, the results of these studies do not present a clear picture of the prognostic indicators, if any, of the course of low back pain in general practice. In the present study, the aim was to investigate prognostic indicators more thoroughly, enabling general practitioners to make a prognosis for the complete spectrum of patients who report low back pain. The present authors focussed on the identification of potential prognostic indicators of 1) the duration of the index episode of low back pain and 2) the occurrence of a relapse.

■ Methods

Design of the Study. The present study is a prospective cohort study on the prognosis of low back pain in consecutive patients consulting a general practitioner. Potential prognostic indicators were assessed at the initial visit, and a 1-year follow-up evaluation was done using the results of four weekly questionnaires sent to the patients.

The study did not interfere with the usual management of low back pain by the general practitioners involved.

Study sample. This study was carried out in 11 general practices in Amsterdam and surrounding areas with a catchment population of approximately 26,000 people. Patients were eligible for the study if they had consulted any of these 11 practices for low back pain of any duration between May 1990 and May 1992. Additional criteria were: age over 16 years and reports of pain in the back (or radiating from the back) in the area between Th12 and the gluteal fold. Pregnant women were not eligible for inclusion. Consequently, patients with suspected nonspecific low back pain and patients with suspected specific low back pain were included in the study.

Measurements. At the initial visit, eligible patients were invited to participate in the study. During this visit, the general practitioner completed a form on the history of the reports of symptoms and the results of a physical examination. The patient was asked to complete a set of forms on the duration and the severity of the current low back pain episode and to provide some demographic data.

After inclusion in the study, each patient was monitored for a period of 12 months. The follow-up procedure consisted of four weekly questionnaires on the course of the low back pain sent to the patients by mail.

The patients were sent a reminder if they did not respond within 2 weeks after each mailing. If they did not respond to two successive questionnaires and reminders, they were excluded from the remaining duration of the follow-up period.

Preceding the study, all forms and questionnaires were tested in a feasibility study, which lead to some small adjustments of the lay-out. Further, the general practitioners were trained in two 2-hour sessions to assess and interpret the physical examination test results in a standardized way.

Dependent variables. The follow-up questionnaires included questions on whether the patient had experienced low back pain in each of the 5 preceding weeks. For each patient a "low back pain diary" was created for each of the 52 weeks of the follow-up year. In this diary, the practitioners recorded in which weeks the questionnaires were completed and, for each week of the follow-up year, whether the patient reported low back pain. Reporting low back pain may indicate that the patient experienced low back pain during a part of or during the whole indicated week of the follow-up period.

Missing values up to 4 consecutive weeks were completed, according to a predefined set of criteria, depending on the last and consecutive first-known values (Appendix). Data from questionnaires that were returned after more than 9 weeks between two questionnaires, resulting in more than 4 missing weeks on the "low back diary," were excluded from the analysis.

The Time to Recovery From the Index Episode of Low Back Pain. The time to recovery, *i.e.*, the duration of the index episode of low back pain, was defined as the number of weeks from the initial visit to the end of the episode. In most cases the consecutive weeks with low back pain after the initial visit were followed by 1 or more weeks with low back pain interspersed by a number of weeks with no low back pain. In the authors' opinion, it would not be right to ignore these periods. Consequently, the episode was considered to have lasted until the start of the first 4-week pain-free period.

The Occurrence of a Relapse. Patients were considered to have had a relapse if they reported to have had low back pain in 1 or more of the weeks of the follow-up period after the end of the episode that was present at the initial visit. In all other cases they were considered not to have had a relapse. A relapse also was considered to have lasted until the start of the first next 4-week pain-free period.

Independent variables. *History.*

The duration of the low back pain preceding the initial visit (number of weeks). Sciatica, defined as pain radiating either up to the knee or beyond the knee into one or both legs.

The type of onset of the low back pain, defined to be either sudden or gradual.

The severity of the low back pain at the initial visit, based on the score on a visual analog scale of the low back pain, consisting of a 50-millimeter line with "no pain" on one side and "unbearable pain" on the other side. The visual analog scale is widely used for measuring pain and has been shown to be a reproducible and responsive way of measuring pain.[11,17]

Disability, based on the results of the Roland disability scale. The Roland disability scale is a 24-item questionnaire developed to measure outcome in patients with low back pain.[18] It was derived from the Sickness Impact Profile, and

it has appeared to be a responsive measurement for the outcome of low back pain.[4]

The history of preceding episodes of low back pain, *i.e.*, episodes with low back pain within the year preceding the initial visit.

The history of surgery because of low back pain.

Physical Examination.

Limited straight-leg raising and Lasègues sign, which were both assessed by the straight-leg raising test, *i.e.*, raising the passively straightened leg as far as possible, in patients lying on their back. The definition "limited" was applied if the angle between the subsoil and the raised leg was less than 80 degrees. Lasègues sign was defined as "positive" if the test evoked radiating pain in the leg beyond the knee. The straight-leg raising test appeared to be a reproducible test in two studies.[15,25]

The maximal lumbal flexion, measured by the modified Schobers test.[13] This test appeared to be a reproducible test in two studies.[15,25]

Pelvic tilt and scoliosis, determined by leveling the pelvis by means of wooden boards of different thickness and by examining from the back a forward-bending patient to identify a thoracic hump, that is, establishing a difference of height between the left and right side of the thorax or scapulae.

Patient Characteristics.

Age and sex.

Level of education, *i.e.*, the highest level of education reported by the patient.

Occupational low back load, *i.e.*, jobs involving considerable amounts of heavy lifting, jobs mainly involving the driving of vehicles, mainly sitting work, and nonclassifiable jobs.

Commuting by car, *i.e.*, the mean duration of time patients reported driving a car to work each day.

Perceived health and daily functioning measured by part 1 and part 2 of the Nottingham Health Profile (NHP), respectively. The NHP was developed to screen populations on different aspects of their health and was used in several studies on patients in general practice, especially in the United Kingdom.[9,10]

General practitioner judgment on the possible involvement of psychosocial problems. Three ways of possible involvement of psychosocial problems were discerned: involvement in the development of the low back pain, involvement in the persistence of the low back pain, and psychosocial problems as a consequence of the low back pain.

Receiving physical therapy. Patients who indicated on the first postal questionnaire that they had received physical therapy during the preceding 5 weeks were discerned from patients who had not.

Physical therapy in the Netherlands usually consists of combinations of exercise therapy and modalities such as heat, cold, and massage, and advice on daily behavior. Physical therapy frequently is applied in the management of low back pain and in general is covered financially by health insurances.

The authors of the present study only considered the effect of any physical therapy during the first weeks, because this may affect the subsequent course of low back pain, whereas physical therapy at a later date in the follow-up period would be a consequence of the prolonged course as much as it would be a factor that possibly affects the subsequent course.

Analysis. The analysis was performed using SPSS-PC (SPSS, Inc., Chicago, IL) and EGRET statistical software (Statistics and Epidemiology Research Corp., Seattle, WA).[6,22] The two dependent variables were used in two separate multivariate analyses. For "the time to recovery," all independent variables first were tested for association with the time to recovery in a bivariate correlation analysis. Subsequently, a Kaplan-Meier survival curve was constructed, and Cox regression with a forward stepwise selection procedure was used to assess predictors of the time to recovery. Candidates for entry into the model were all independent variables associated with the dependent variable in the bivariate analysis (threshold $P < 0.10$). In the first phase independent variables that were plausible predictors of the time to recovery were entered into the model (based on prior knowledge). In a second phase, the remaining candidate variables were tested for their predictive properties. In the final phase, interaction terms were added and tested for further improvement of the model. In each step of the analysis, only those records that included complete information for all variables tested were used. Finally, the significance of the complete model against the null model was calculated.

Logistic regression analysis was used for the assessment of predictors of "the occurrence of a relapse," using a similar selection procedure.

■ Results

Study Population

A total of 605 eligible patients were identified during the recruitment period. Of these, 443 actually were included in the follow-up period of study. In general, patients who were not included in the follow-up study were a few years younger, more often males, more often experiencing nonradiating low back pain with a sudden onset, and were less often referred to either a physiotherapist or a consultant ($P < 0.05$).

Thirty-five patients were diagnosed as possibly having specific low back pain, *i.e.*, low back pain as a result of disc protrusion, ankylosing spondylitis, or neoplastic disease. In nine of these patients disc protrusion was confirmed by a consultant, and in one patient ankylosing spondylitis was diagnosed within the 1-year follow-up period.

The follow-up period was completed after the end of the index episode of low back pain by 389 of the 443 patients included (88%). A total of 269 patients (60%) completed the whole follow-up year of study. The 175 patients who did not complete the follow-up period were a few years younger and were experiencing nonradiating low back pain ($P < 0.05$) more often than patients who

Table 1. Patient Characteristics at the Initial Visit for Participants, Nonparticipants, Those Who Completed the 1-Year Follow-Up Period, and Drop-Outs

	Participants (n = 443)	Nonparticipants (n = 162)	Completers (n = 268)	Drop-Outs (n = 175)
Mean age in yrs. (SD)*	43.9 (14.6)	41.0 (16.6)	45.0 (14.3)	42.1 (15.0)
Male (%)†	48	58	45	52
Duration at initial visit (%)				
< 1 week	36	37	33	39
1–7 weeks	42	44	45	39
> 7 weeks	23	20	23	24
Median severity of pain (IQR)‡	25 (15–33)	22 (13–33)	25 (15–35)	24 (14–32)
Median severity of disability (IQR)‡	13 (8–16)	12 (7–16)	13 (8–16)	14 (7–14)
Sciatica (%)*†	47	36	52	40
Straight-leg raising limited (%)	16	13	18	14
Sudden onset (%)†	48	58	48	47
History of surgery (%)	6	3	6	6
Referred at initial visit (%)†	56	42	55	57

* *P* value less than 0.05 for differences between those who completed the 1-year follow-up period and those who dropped out.
† *P* value less than 0.05 for differences between participants and nonparticipants.
‡ Visual analogue scale for pain; 0–50; Roland-disability-scale for disability; range, 0–24.
IQR = Interquartile range.

did complete the 1-year follow-up period. The relevant patient characteristics are presented in Tables 1 and 2.

The Time to Recovery From the Index Episode of Low Back Pain

The median time to recovery from the index episode was 7 weeks (interquartile range (IQR), 3–16). The Kaplan-Meier curve shows that 70% of patients still had low back pain after 4 weeks, 48% after 8 weeks, 35% after 12 weeks, and at the end of the follow-up year 10% of the patients still had low back pain (Figure 1).

Bivariate analysis revealed a few variables that were associated with the time to recovery ($P < 0.05$). These included "the duration of the low back pain episode preceding the initial visit," "sciatica," "maximal lumbal flexion," three aspects of perceived health, and "receiving physical therapy." The multivariate analysis resulted in a four-variable predictive model (Table 3). The significance of the complete model against the null model was calculated to be less than 0.001.

A hazard ratio of less than 1 indicates that the variable is a negative hazard for the time to recovery; the variable is associated with a longer time to recovery. Consequently, the results indicate that the longer the duration preceding the initial visit, the longer it will take to recover from low back pain. A hazard ratio of 0.98 per week means that at every moment in time for each week of low back pain preceding the initial visit, patients had a 2% lower chance to recover in the following week. The strength of this association is illustrated in Figure 2. This figure shows that the duration of the low back pain at the initial visit exceeded 7 weeks for almost all patients who still had low back pain at the end of the follow-up period. Further, the time to recovery for patients with less than 1 week of low back pain at the initial visit appears to have been a few weeks shorter than the time to recovery for other patients.

The results of the present study indicate that patients receiving physical therapy during the first 5 weeks after the initial visit also will take longer to recover from low back pain than those not receiving physical therapy. A hazard ratio of 0.62 signifies that at every moment in time patients receiving physical therapy had a 61% less chance to recover in the following week than patients not receiving physical therapy. This is illustrated in Figure 3, which shows that the time to recovery was approximately 4 weeks longer for patients who received physical therapy than for patients who did not receive physical

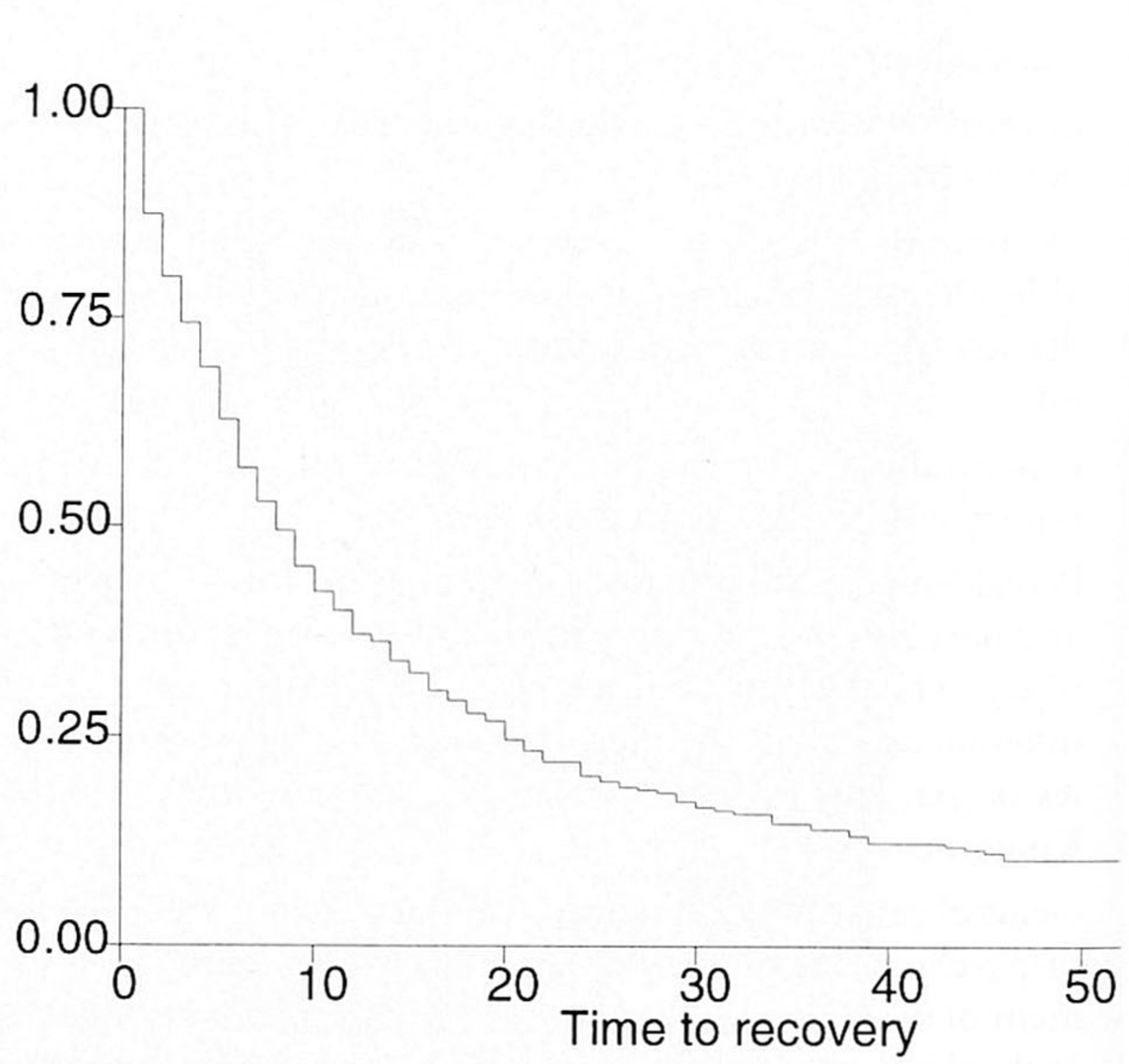

Figure 1. The time to recovery from the index episode of low back pain presented in general practice. The Kaplan-Meier survival curve of the time to recovery after the initial visit is shown. The numerator at each week of the follow-up period equals the number of patients still in pain, *i.e.*, the patients whose index episode had not yet ended. The denominator equals the number of cases still in pain plus the number of patients whose pain ended in one of the preceding weeks (443 in week 1 and 389 in week 52). Half of the total number of patients whose pain or whose participation in the study ended in a specific week also was included in the denominator.

Table 2. Prevalence of Potential Prognostic Indicators at the Initial Visit in the Study Population (n = 443)

Prognostic Indicator	Prevalence
History	
Duration preceding the initial visit (median, IQR)	2 weeks, 1–9
Sciatica	3% up to, 19% beyond the knee
Type of onset	48% sudden, 59% gradual
Severity of the pain (0–50; median, IQR)	25, 15–33
Severity of the disability (0–24; median, IQR)	13, 8–16
History of preceding episodes	40%
History of surgery	6%
Physical examination	
Straight-leg raising limited	16%
Lasèques sign positive	5%
Maximal lumbal flexion (median, IQR)	5 cm, 3–6 cm
Pelvic tilt and scoliosis	6%
Patient characteristics	
Age (median, IQR)	42 years, 33–55 years
Sex	48% men, 52% women
Level of education (1–7)*	10, 15, 24, 14, 13, 12, 8%, respectively
Occupational workload	10% heavy lifting, 4% driving vehicles, 22% sitting
Commuting by car	54% less than, 19% more than 1 hour
Perceived health (0–100; median, IQR)†	
Pain	45, 23–65
Declined mobility	22, 23–65
Disturbed sleep	0, 0–22
Tiredness	24, 0–63
Emotional problems	7, 0–14
Social isolation	0, 0–0
Daily functioning (0–7; median, IQR)‡	3, 1–4
The involvement of psychosocial problems (1–5)§	
In the development	54, 13, 11, 14, 4%, respectively
In the persistence	51, 13, 12, 13, 6%, respectively
As an effect of the low back pain	64, 16, 10, 3, 1%, respectively
Receiving physical therapy during the first 5 weeks after the initial visit	60%

* Level of education: 1 = less than high school, 7 = academically educated.
† Perceived health: 0 = no disturbance, 100 = total disturbance of specified aspect of perceived health.
‡ Daily functioning: 0 = no aspect disturbed, 7 = all aspects of daily functioning disturbed.
§ Involvement of psychosocial problems: 1 = no involvement, 5 = involvement very probable to the judgment of the general practitioner.
IQR = Interquartile range, 25th–75th percentile.

Table 3. Multivariate Predictive Model with Cox-Regression for the Time to Recovery From the Index Episode of Low Back Pain*

	Hazard Ratio	95% Confidence Interval
Duration preceding the initial visit (number of weeks)	.98	.97–.99
Receiving physical therapy during the first 5 weeks after the initial visit (yes or no)	.62	.49–.78
Pain, as as aspect of perceived health (score 0–100)	.99	.99–1.00
History of surgery (positive or negative)	.58	.36–.94

* The significance of the complete model against the null model was calculated to be less than 0.001.

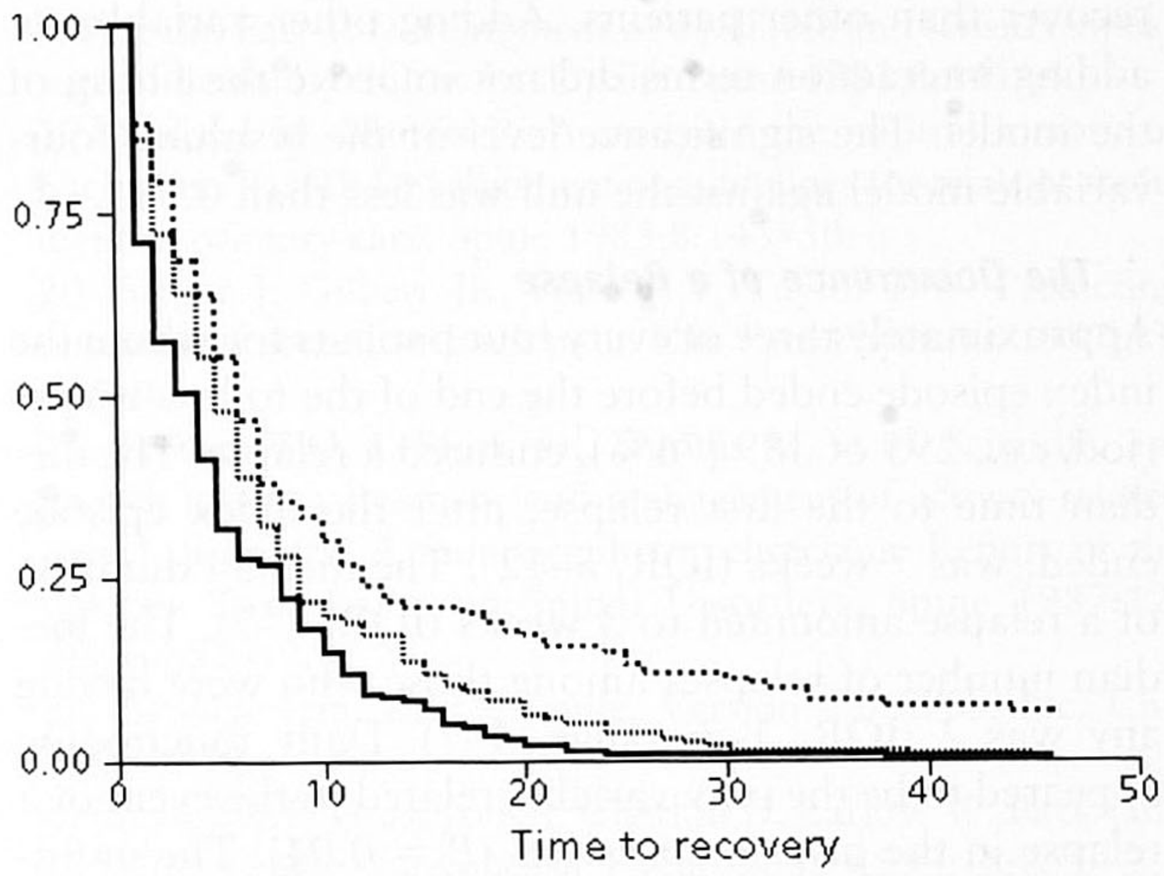

Figure 2. The time to recovery from the index episode of low back pain in patients with less than 1, 2–7, and more than 7 weeks of low back pain preceding the initial visit. The Kaplan-Meier survival curve of the time to recovery from the initial visit is shown for patients with less than 1 week (bottom curve), patients with more than 1 week and less than 7 weeks (middle curve), and patients with more than 7 weeks (top curve) with low back pain at the initial visit.

therapy. Pain measured by the Nottingham Health Profile and the history of surgery because of low back pain also were associated with the time to recovery. However, these two variables added only slightly to the model (likelihood ratio 11.6 and 5.8 for pain and history of surgery, respectively, *versus* 25.2 and 17.9 for duration of low back pain and receiving physical therapy, respectively). Patients with high scores on pain and patients with a history of surgery also took somewhat longer to

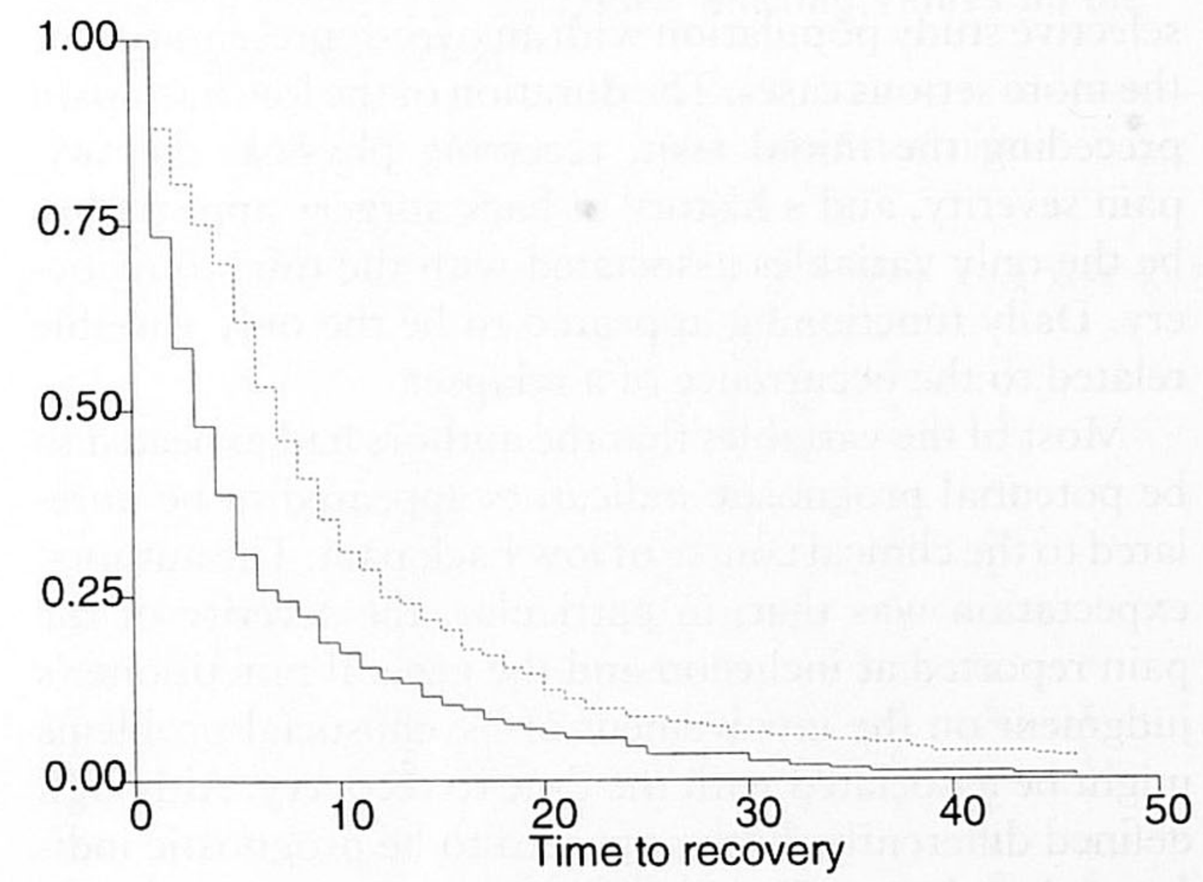

Figure 3. The time to recovery from the index episode of low back pain in patients receiving physical therapy and in patients not receiving physical therapy. A Kaplan-Meier survival curve on the time to recovery from the initial visit is shown for patients receiving physical therapy during the first 5 weeks after the initial visit (top curve) and for patients not receiving physical therapy during the first 5 weeks after the initial visit (bottom curve).

recover than other patients. Adding other variables or adding interaction terms did not improve the fitting of the model. The significance level of the resulting four-variable model against the null was less than 0.001.

The Occurrence of a Relapse

Approximately three of every four patients for whom the index episode ended before the end of the follow-up period, *i.e.*, 295 of 389 (76%), endured a relapse. The median time to the first relapse, after the index episode ended, was 7 weeks (IQR, 5–12). The median duration of a relapse amounted to 3 weeks (IQR, 1–7). The median number of relapses among those who were having any was 2 (IQR, 1–3; range, 1–7). Daily functioning appeared to be the only variable related to the event of a relapse in the bivariate analysis ($P = 0.04$). The multivariate logistic regression equation did not reveal any other variable to be associated with the occurrence of a relapse. Daily functioning explained only 2% of the variation of the dependent variable.

■ Discussion

In this study the authors tried to avoid repeating the methodologic shortcomings of previous studies on the prognosis of low back pain. Consecutive patients, *i.e.*, recent onset and chronic cases, were included, and a prospective design was used, including a detailed 1-year follow-up period of study.

However, the present study also has its limitations. Not all identified patients participated in the follow-up study, and some of the patients included did not complete the follow-up period. Patients with less serious low back pain were somewhat less likely to participate or to complete the follow-up study. This may have lead to a selective study population with an over-representation of the more serious cases. The duration of the low back pain preceding the initial visit, receiving physical therapy, pain severity, and a history of back surgery appeared to be the only variables associated with the time to recovery. Daily functioning appeared to be the only variable related to the occurrence of a relapse.

Most of the variables that the authors had expected to be potential prognostic indicators appeared to be unrelated to the clinical course of low back pain. The authors' expectation was that, in particular, the severity of the pain reported at inclusion and the general practitioner's judgment on the involvement of psychosocial problems might be associated with the time to recovery. Although defined differently, both appeared to be prognostic indicators in other studies.[3,5,19,20,23]

The duration at the initial visit and some other aspects of the history, such as back surgery, appeared to be prognostic indicators in the present study and in most of the preceding studies.[2,3,5,12,16,19,20,23] Chronic low back pain and a history of low back pain seem to be associated with a less favorable clinical course.

The association between the duration at the initial visit and the time to recovery does not seem logical, however. One would expect a patient who had already endured a few weeks of low back pain to be closer to the moment of recovery than a patient whose pain started more recently. This is not the case in either the present study or in preceding studies.[2,3,5,12,16,19,20,23]

This seemingly illogical association may be regarded as an indication of the potentially deteriorating effects of the behavioral and other psychological consequences of having low back pain for more than just a few weeks.[7,21,26] Various aspects of daily functioning will be hindered or disturbed because of low back pain. This would convince patients that they were sick and may have a deteriorating effect on the course of the low back pain. Further, the decision to visit a general practitioner obviously is not only determined by the duration of the low back pain. The most striking and puzzling result of the present study may be that patients receiving physical therapy appeared to have a prolonged time to recovery compared with patients not receiving physical therapy. Apart from the eventuality of a type one error, there are two possible and perhaps complementary explanations.

First, physical therapy actually may have a deteriorating effect on the course of low back pain. Obviously, though, this would be counter-intuitive, and in no way can this be concluded solely on the basis of the results of the present explorative study. However, therapeutic interventions may invoke patients to consider themselves sick or disabled and, from the behavioral point of view, this may have a deteriorating effect.[7] Further, the history of the medical management of low back pain reveals some evidence of the potentially deteriorating effects of medical intervention.[1,26] In addition, the results of a recent study on the management of acute low back pain revealed that patients had better outcomes if they did not exercise or did not take bedrest.[14]

Alternatively, some aspect of having low back pain, one the authors of the present study did not detect, may be related to the decision to start physical therapy and to the time to recovery. For instance, it could be that general practitioners recognize patients with a less favorable natural course on the basis of a variable that was not detected in this study and that these are the patients that are referred to physical therapy. Or, it could be that patients with specific characteristics that predispose them to a less favorable course more often than others urge their general practitioner to refer them for physical therapy. Consequently, physical therapy may be predominant in patients with a less favorable course.

These undetected variables or characteristics that predispose a patient to a less favorable course do not necessarily refer to the physical element of having low back pain. Conceptual models on pain all emphasize the potential influence of the emotional, behavioral, and social aspects of having pain.[21,26] Future research clearly is needed to establish a valid explanation for this counter-

intuitive finding. For instance, clinical trials on therapeutic interventions in low back pain may consider "no therapy" to be one of the tested interventions. The present authors' comprehensive attempt to determine the predictability of the course of low back pain presented in general practice, however, considering a large number of potential prognostic indicators, leads to the conclusion that only a few variables seem to be related to the clinical course of low back pain.

References

1. Allan DB, Waddell G. An historical perspective on low back pain and disability. Acta Orthop Scand 1989;60(Suppl): 1–23.
2. Chavannes AW, Gubbels J, Rutten G, Thomas S. Acute low back pain: Patients' perceptions of pain four weeks after initial diagnosis and treatment in general practice. J Roy Coll Gen Pract 1986;36:271–73.
3. Coste J, Delecoeuillerie G, Cohen de Lara A, Le Parc JM, Paolaggi JB. Clinical course and prognostic factors in acute low back pain: An inception cohort study in primary care practice. Br Med J 1994;308:577–80.
4. Deyo RA. Comparative validity of the Sickness Impact Profile and shorter scales for functional assessment in low back pain. Spine 1986;11:951–54.
5. Deyo RA, Diehl AK. Psychosocial predictors of disability in patients with low back pain. J Rheumatol 1988;15:1557–64.
6. EGRET. Reference Manual, Revision 4. Statistics and Epidemiology Corporation. Seattle, WA, 1993.
7. Fordyce WE, Brockway JA, Bergman JA, Spengler D. Acute back pain: A control-group comparison of behavioral *versus* traditional management methods. J Behav Med 1986;9: 127–40.
8. Hoogen JMM van den, Koes BW, Eijk JThM van, Bouter LM, Deville W. Pain and health status of primary care patients with low back pain. J Fam Pract 1997;44:187–92.
9. Hopton JL, Porter AMD, Howie JGR. A measure of perceived health in evaluating general practice: The Nottingham Health Profile Family Practice 1991;8:253–60.
10. Hunt SM, McEwen J, McKenna SP. Measuring health status: A new tool for clinicians and epidemiologists. J Roy Coll Gen Pract 1985;35:185–88.
11. Huskisson EC. Measurement of pain. Lancet 1974;2: 1127–31.
12. Lanier DC, Stockton P. Clinical predictors of outcome of acute episodes of low back pain. J Fam Pract 1988;27:483–9.
13. Macrae IF, Wright V. Measurement of back movement. Ann Rheumatol Dis 1969;28:584–9.
14. Malmivaara A, Häkkinen U, Aro T, et al. The treatment of acute low back pain: Bed rest, exercises, or ordinary activity? New Engl J Med 1995;332:351–5.
15. McCombe PF, Fairbank JCT, Cockersole BC, Pynsent PB. Reproducibility of physical signs in low back pain. Spine 1989; 14:908–18.
16. Pedersen PA. Prognostic indicators in low back pain. J Roy Coll Gen Pract 1981;31:209–16.
17. Price DD, McGrath PA, Rafii A, Buckingham B. The validation of visual analogue scales as ratio scale measures for chronic and experimental pain. Pain 1983;17:45–56.
18. Roland M, Morris R. A study of the natural history of back pain. Part 1: Development of a reliable and sensitive measure of disability in low back pain. Spine 1983;8:141–4.
19. Roland M, Morris R. A study of the natural history of back pain. Part II: Development of guidelines for trials of treatment in primary care. Spine 1983;8:145–50.
20. Singer J, Gilbert JR, Hutton T, Taylor DW. Predicting outcome in acute low back pain. Can Fam Physician 1987;33: 655–9.
21. Spitzer WO, LeBlanc FE, Dupuis M, et al. Scientific approach to the assessment and management of activity-related spinal disorders: A monograph for clinicians. Report of the Quebec Task Force on Spinal Disorders. Spine 1987;12: (Suppl):S1–59.
22. SPSS/pc+tm. User's Guide, Version 5.0 SPSS, Inc. Chicago, 1992.
23. Von Korff M, Deyo RA, Cherkin D, Barlow W. Back pain in primary care: Outcomes at 1 year. Spine 1993;18:855–62.
24. Von Korff M. Studying the natural history of back pain. Spine 1994;19(Suppl):S2041–46.
25. Waddell G, Main CJ, Morris EW, Venner RM, Rae PS, Sharmy SH, Galloway H. Normality and reliability in the clinical assessment of backache. Br Med J 1982;284:1519–1523.
26. Waddell G. A new clinical model for the treatment of low back pain. Spine 1987;12:632–44.

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Appendix. Criteria to Substitute Missing Values on the "Low-Back Pain Diary."

Reported and Missing Values							Data After Substitution						
Follow-up week number													
X	X+*	X+†	X+3	X+4	X+5		X	X+*	X+†	X+3	X+4	X+5
1	·	*				>	*	‡	*			
1	·	†				>	*	§	†			
2	·	†				>	†	§	†			
2	·	*				>	†	§	*			
1	·	·	*			>	*	‡	‡	*		
1	·	·	†			>	*	‡	§	†		
2	·	·	†			>	†	§	§	†		
2	·	·	*			>	†	§	‡	*		
1	·	·	·	*		>	*	‡	‡	‡	*	
1	·	·	·	†		>	*	‡	‡	§	†	
2	·	·	·	†		>	†	§	§	§	†	
2	·	·	·	*		>	†	§	§	‡	*	
1	·	·	·	·	*	>	*	‡	‡	‡	‡	*
1	·	·	·	·	†	>	*	‡	‡	§	§	†
2	·	·	·	·	†	>	†	§	§	§	§	†
2	·	·	·		*	>	†	§	§	‡	‡	*

* = Data reported by the patient indicating to have had low back pain during that week; † = Data reported by the patient indicating not to have had low back pain during that week; ‡ = Imputed data indicating that the patient was supposed to have had low back pain during that week; § = Imputed data indicating that the patient was supposed not to have had low back pain during that week. · = Missing data. > = Was substituted into.